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Frederiksen et al.

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(54) **METHOD, APPARATUS AND COMPUTER PROGRAM TO MAP A CYCLIC SHIFT TO A CHANNEL INDEX**

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(71) Applicant: **Nokia Siemens Networks Oy**, Espoo (FI)

(72) Inventors: **Frank Frederiksen**, Klarup (DK); **Esa Tirola**, Kempele (FI)

(73) Assignee: **Nokia Siemens Networks Oy**

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(57) **ABSTRACT**

From the network perspective, an uplink resource allocation (PDCCH) is sent that grants an uplink resource to a plurality of user equipments UEs, and the allocation has an indication of a cyclic shift CS for each of the plurality of UEs. The granted uplink resource is mapped to a downlink resource (PHICH) in dependence on the indicated CS for each of the plurality of UEs. The mapping is such that for a predetermined number of UEs being allocated a same uplink resource in a single MU-MIMO uplink resource allocation grant, each pair of said predetermined number of UEs which map to an adjacent downlink resource exhibit an optimized CS relative to one another. The network sends to each of the respective plurality of UEs on the respective mapped downlink resource an indication (ACK/NACK) about data received (on a PUSCH). Apparatus, method, and computer programs for network and UE side implementations are detailed.

